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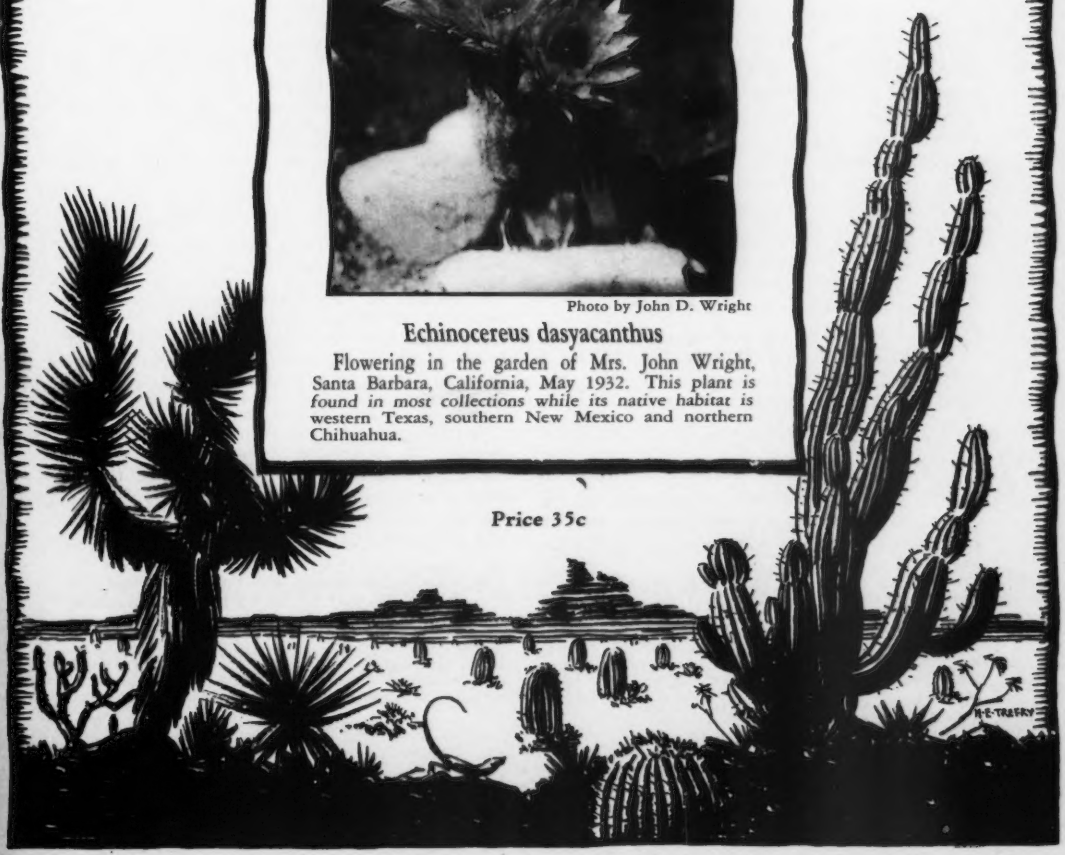
Photo by John D. Wright

Echinocereus dasyacanthus

Flowering in the garden of Mrs. John Wright, Santa Barbara, California, May 1932. This plant is found in most collections while its native habitat is western Texas, southern New Mexico and northern Chihuahua.

Price 35c



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A monthly magazine to promote the Society and devoted to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. "The Cactaceae," by N. L. Britton and J. N. Rose, has been adopted by this journal for purposes of identification. (Membership and subscription $3.00 per year, foreign $3.00 per year.) Mail membership application and subscription to the Secretary, Ted Hutchison, 1800 Marengo Street, Los Angeles, California.

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A Valuable Contribution

Under the direction of Mrs. John D. Wright of Santa Barbara, Anne Smith has compiled a list of cacti with their geographical origin. (See page 334.) This index is arranged in alphabetical order and includes first the states of the United States and this will be followed by the foreign countries. The locality in which the type specimen was found and the distribution of each species is recorded. The list includes all the species given in Britton and Rose's "The Cactaceae", all the new species described since then in the German Cactus Journal, in Berger, in the Griffith monographs and in our own JOURNAL.

This list will be invaluable for the student or for anyone planning a collecting trip to a certain locality. In the same manner this list will be of value as a key to the name of any species found in a locality.

The Cactus Society is fortunate to be able to present this very valuable information to the cactus world, and as the list proceeds we can appreciate the years of work which Mrs. Wright has given to this work.

SCOTT E. HASELTON.

There were no cactus in Palestine or in all the Mediterranean region in biblical times, those found there today are all naturalized importations from America.

A Cactus and Succulent show is scheduled for the last week in July at the Century of Progress International Exhibition which will open June first at Chicago, Ill. A representative of the exposition extended an invitation to the Cactus & Succulent Society at the December meeting held in Pasadena. The society is asked to participate as such, and requests all of its members to enter exhibits of their plants. Full details of the executive board's action in the matter will appear in the following issue of the JOURNAL.

Dr. Herbert Dozier and C. C. Compton, two entomologists at the Illinois State Natural History Survey, Urbana, Ill., have discovered that Mexican mealy-bugs, which are the destructive parasites of our domesticated Cactus and Succulent plants, are victims of the Sicilian mealybug parasite.

This latter insect was brought to America to fight the Mexican mealybug which not alone attacks cactus but citrus fruit as well. It kills by piercing the body of the Mexican mealybug and laying an egg, which hatches into a destructive feeding grub.

Mr. Compton's plan is to introduce the Sicilian parasite into greenhouses infested with mealybugs, and if the experiment succeeds, large scale use of them is probable. Eric Walther has been making successful experiments along this same line in Golden Gate Park, San Francisco.

In the African deserts the Euphorbias take the place that is occupied by the Cacti in the American deserts. In short, here is nature's example of the manner in which two totally unrelated groups of plants, thriving in separate continents, have solved the problem of survival in a very similar way with leafless succulent stems full of water.

Ferocactus gracilis growing amongst *Pachycereus pringlei, Idria columnaria* and *Agave nelsonii* Lake Chapala, Lower California, Mexico

Four New Species of Ferocactus from Lower California, Mexico

By HOWARD E. GATES

Photos by Author. Part I.

Ferocactus gracilis sp. nov.

Plerumque solitaria, globosa-cylindricata, usque ad 3 m. alta, 3 dm. diametro; costae 24, tuberculatae, intercostiis non altis; tubercula insignia, proxima; areolae anguste ellipticae, 1.5 cm. longae; spinae radiales ab utroque latere areolae 5 (cunctae 10), primo parallelae at deinde patulae, aciculares, subalbae, subnigrescentes aetate, 2.5-4 cm. longae; spinae mediae 7-13, variabiles, subulatae, praeter superiorem in medio quae ab utroque parte ascendens planaque est, praeterque inferiorem in medio quae est infra curvata, aliquid supra concavata, plantis in junioribus aliquid convoluta aliquandoque hamata, omnes annulatae, pungentes, colore hebetes et sanguineae extremis aliquando cum candidioribus, omnes aetate nigrescentes, oppressae, intertextae; flores in apice plantae siti, circa 4 cm. longi, luridi, quorum quodque segmentum perianthium linea rubro-fulva extra in medio decurrente notatum; fructus oblongus, luteus, paucis cum squamis lunatis; semina numerosa, nigra, nitentia.

Plants usually solitary, globose to cylindric, to 3 m. high and 3 dm. in diameter; ribs 24, tuberculate, intercostal spaces shallow; tubercles prominent, approximate; areoles narrowly elliptic, 1.5 cm. long; radial spines ordinarily 5 on each side of areole (10 in all), parallel at first but later spreading, acicular, whitish becoming dark gray in age, 2.5-4 cm. long; central spines 7-13, variable, subulate excepting the upper middle one which is ascending and flattened on both sides and the lower middle one which is rounded below, slightly concave above, more or less convolute and occasionally hooked on younger plants, all annulate, pungent, dull dark red with lighter tips on some, all becoming black, appressed and interlocking in age; flowers situated at the apex of the plant, about 4 cm. long, straw-yellow with maroon stripe down center of outer surface of each perianth segment; fruit oblong, yellow, bearing a few lunate scales; seed numerous, black, shining.

TYPE: *Gates No. 22,* from hills to the west of Mission San Fernando, Baja California, July 25, 1932, and deposited in the Dudley Herbarium of Stanford University (No. 207826). The distribution of this species covers the central portion of Lower California from the 29th to the 30th Parallels. Specimens are in Californian and European gardens under my collection number.

In comparison to the other Baja Californian species of *Ferocactus,* mature specimen of *F. gracilis* are the slenderest, from which fact the specific epithet is derived. The plants appear to prefer the detrital slopes common in this portion of the peninsula. In places the plants are very abundant and form a striking feature of the landscape.

Ferocactus gracilis, Catavina, Lower California, Mexico*

Ferocactus viscainensis sp. nov.

Planta solitaria, globosa-subcylindricata, usque ad 1.5 m. alta, 3 dm. diametro; basis plantae junioris perconstricta; costae 13-21, subtenues, undulatae, altis cum intercostiis, colore hebetes et olivaceae; areolae magnae, ellipticae, 1.5-2 cm. longae, 1-4 cm. distantes; spinae radiales fere 4, aliquando ad 2 vel 1 reductae, aciculares, plerumque erectae, colore hebetes et canae; spinae mediae 5 ad 9, rigidae, robustae, annulatae, colore hebetes et subcanofulvae, omnes rectae, pungentes praeter unam quae de medio areolae orta saepe ad 13 cm. producitur, in latitudinem 6 mm. complanatur, supra concavata, deflexa, aliquid tortulosa, firme hamata; flos circa 4.5 cm. longus, segmentis perianthiis lanceolatis, acuminatis, luridis, quorum quidque linea purpurea extra in medio decurrente insigne notatum; fructus oblongus, 4 cm. longus; semina numerosa, nigra, nitentia.

Plants solitary, globose to subcylindric, to 1.5 m. high, 3 dm. in diameter; bases of young plants much constricted and scarcely seated in the soil; ribs 13-21, comparatively thin, undulate, intercostal spaces deep, dull olive green, margins occasionally purplish; tubercles more distinct in older plants than on younger ones; areoles large, elliptic, 1.5-2 cm. long, 1-4 cm. apart; radial spines usually 4, but sometimes reduced to 2 or 1, on each side of the areole, irregularly thickened (weak to stiff), acicular, mostly erect, dull grayish white; central spines

Ferocactus viscainensis near Mesquital, Lower California, Mexico

5 to 9, stiff, robust, annulate, dull grayish brown, all straight and pungent except one: this arising from the center of the areole and often becoming lengthened to 13 cm. on younger plants, flattened to a width of 6 mm., concave above, deflected, somewhat tortulose, strongly

*The dignified gentleman is Secretary of the Cactus and Succulent Society of America. Your Editor hastens to advise you that this picture is not flattering but it does show that Ted is an earnest student of cacti and shared the hardships with Mr. Gates on an expedition into Mexico.—S. E. H.

hooked; flowers about 4.5 cm. long, perianth-segments lanceolate, acuminate, straw-yellow

Young plant of *Ferocactus viscainensis* near Mesquital, Lower California, Mexico

with a pronounced purple strip down center of outer surface of each segment; fruit oblong, 4 cm. long, with a few broad scales, yellow; seed numerous, black, shining.

TYPE: *Gates No. 43,* collected at Mesquital, Baja California (28° 25′ N, 113° 50′ W), July 22, 1932, and deposited in the Dudley Herbarium (No. 207824). The accompanying illustration is that of a specimen as growing at the type locality.

The specific appellation is derived from the bay which limits the westward range of the species, namely, Sebastian Vizcaino Bay, so called in honor of an early Spanish explorer. The distribution of the species extends over a belt extending from Vizcaino Bay easterly to Calmalli.

In most of the plants the spines are very strong and the areoles almost tuberculate; the tubercles are more prominent on younger than on older plants.

Plants are in both Californian and European gardens under my field number.

Continued in March Journal

Cephalocereus royenii

By GEORGE F. ANTON, *Porto Rico*

Cephalocereus royenii is the most hardy cactus plant we have in Porto Rico. Usually it is found along the south coast of the Island and has been seen to penetrate to the interior back of the hills where one would not expect to find it. Civilization, however, seems to be rather unkind to it for whenever it occurs near roads or habitations the people seem to take a delight in trying the edge of their machetes on it. As a consequence in order to see a healthy plant one must leave the beaten path and look for it in the wilds. Under cultivation and in rather humid localities it seems to stand up better than any of the other cacti we have. Plants that have been planted for over two years in a locality where the precipitation is close to 100 inches appear to have a normal growth and a surprising absence of scale, the worst enemy of this plant.

In its native haunts it grows in dense colonies, as shown by the accompanying pictures, and it is not unusual to see plants of twenty feet in height. One often sees single plants perfectly straight and from fifteen to twenty feet, as is attested by Fig. 1. This plant measures 12 feet 8 inches and is one of the cleanest and healthiest plants I have seen. When the soil conditions are favorable this plant has been observed to attain a diameter of 4 to 5 inches. In the vicinity of Tallaboa along the south coast at a flat stretch of land they are so dense, so tall and healthy that the only word which comes near to describing them is "majestic".

FIG. 1. *Cephalocereus royenii* measuring 12 feet 8 inches from the ground. Locality—southwest of Ensenada at Salinas. Note *Cactus intortus* at its base. Photo by author October 15, 1931.

The soil in which this plant is found appears to be rich in pulverized leaf mold. One often will find a plant coming out of a fissure in a limestone, and will often jump at the conclusion that this plant does not require very much soil. Consistent observation has revealed that even though the plant comes out of a rock its roots extend well beyond the limestone and in good soil. Usually there is a central root that shoots straight down into the soil and several laterals spreading out below the surface for a few inches. These lateral roots extend for several feet around the plant. If the soil is poor, such as impervious clay, the plants have a stunted sickly appearance and attain a very small growth in a season; whereas in rich

FIG. 2. Crested *Cephalocereus royenii* found at Salinas, September, 1931.

humus soil, well drained, the growth for a season may reach two to three feet, and sometimes more.

Cephalocereus royenii can be grown successfully either from seed or from cuttings. If the cuttings are allowed to heal well and then planted in fine clean dry sand they root very readily. Experience has shown that a cutting will do better if supported on a crutch with its base resting on a two-inch layer of fine clean sand under which is the soil intended for it. In the course of one to two weeks roots will shoot down past the sand and into the humus soil.

One would expect to find this plant in the crested form very readily, but during the past two years only one such plant was found on

FIG. 3. *Cephalocereus royenii* photographed by author at Salinas, October 15, 1931.

this Island. Fig. 2 shows this crest, and unless someone can give us some more information we shall claim it to be the only Cephalocereus crest in captivity. On the side of this plant are shown two new shoots: The upper one is crested and the lower of normal shape.

LIMITING YOUR COLLECTION

Has your appetite for cactus become slightly jaded? Are you a new collector wondering how to make the best and most interesting collection? Do you have a large collection and wish to make it of some value to science? THEN SPECIALIZE!

A cure-all or tonic—SPECIALIZATION.

Many of us there are who collect that which appeals to our sense of the beautiful or extraordinary. Too many of us have become interested in "Cactus" and have a conglomerate collection that serves little purpose and soon tires us. The first group is small by comparison with the second; but we do not have to worry about them. Those who seek beauty can always find some new manifestation.

The second group are on their way to an interesting hobby but have not yet found the proper paths to follow. I sincerely hope that they will heed my cry and SPECIALIZE.

The Cactus Family is probably as little known as any of the large families of plants. Its three tribes and many genera will still stand for revision and

addition. Many of the members of the family still live in unknown spots, never yet seen by the eyes of science. Perhaps the secret of the family history may be revealed by a genus now unknown. Studies of known species are yielding wonderful facts of relationship to other species and groups.

We read of expeditions to far-off corners of the world that go in the interests of science, and think that surely there must be immense wealth behind such parties. In a very, very few instances they are supported by some wealthy person. In the large majority of instances the men who go pay the larger part of their own way; endure terrible hardships; contract diseases; work long hours at heavy labor; and return to their ill-paid jobs; all for the sake of Science—that unknown Organization that rules the universe.

Because cactus are found native only in our hemisphere we have an opportunity to collect, grow, and study them that will enable us to make a contribution to Science without enduring the costs and hardships that go with expeditions. Within eight hundred miles from home have been sent to me two plants that give an entirely new light on a genus formerly recognized as having only one species. One of these may be found by driving comfortably for not more than eight hours over paved roads, ending with a short desert stretch of good road.

Only fifty miles from Los Angeles is a spot where grow cactus that, I firmly believe, will clear up the mystery of Southern California's *Opuntia* species.

There are two general ways to SPECIALIZE: 1. Either try for all the representatives of a *limited* locality, or 2. Try to collect all of a *certain* Tribe, Subtribe, Genus, or other group.

Until just two months ago I do not know of any one who had, or was even trying for, a complete representation of California cactus. I would like to hear today from some one who has more than a dozen species of *Echinocereus,* and still they are not hard to obtain nor hard to grow. If anyone has trouble in settling on a group in which to specialize, I would be glad to confer with them, for I have in mind problems that I will never have time to solve.

There are several contributors to the JOURNAL who will be just as happy as I will, to suggest groups or problems that you may work on with the plan of contributing some real facts now unknown. They have found problems in their fields and in related subjects that they will gladly pass on to those who will work.

Discovery of a new fact offers just as much thrill as would the discovery of new land to an explorer. We can show something to the world that it has never seen and receive credit for the discovery. True, it is difficult to describe a new species or a new genus when we have not been trained in that work, but several large institutions offer their aid to the uninitiated free of charge. The Dudley Herbarium of Stanford University, the California Academy of Sciences, and the National Herbarium at Washington, D. C., have all given me their fullest cooperation.

Let me repeat—whatever your interest, *increase* its value by *limiting* it to a definite problem. When you have solved a mystery, or found all the species of a genus, or have everything from a state, then you may choose another specialization problem that will be just as interesting as the first.

SPECIALIZATION FOR ADDED INTEREST and a hobby that will not go stale.—E. M. BAXTER.

SPINE POINTS by Frick

On a recent field trip through the cactus country of the west, a stop was made at a place called Cactus, Arizona. Addressing the oldest of the half dozen citizens there, the writer remarked, "This is a wonderful place to study cactus with so many right at your door." His answer was "Yep, I knows all about them." Pointing to a *Carnegiea gigantea* I asked, "What is the name of that one?" to which he replied, "Thet's called a big Cactus." After a few moments I again pointed to a *Echinocereus engelmanii* and asked, "What might the name of that cactus be?" "Oh, they jes call that the little Cactus," he answered.

The farthest north that any cactus has been found was in Western Canada, 500 miles north of the international boundary line. Growing in sandy soil along the Peace River, *Opuntia polyacantha* has been found. The farthest north for a member of the Mammillaria tribe is but a short distance into Manitoba to which *Coryphantha vivipara* extends.

A bound set of four volumes of the CACTACEAE by B. & R. sold last month in Pennsylvania for $250.00. Another set, also bound, purchased by former Secretary Ketteringham brought $55.00 to a London, England, book dealer. The former price is too high, the latter too low. The price today is $125.00 with none available!

The Director of the Government National Park Service declares that if the desert vegetation, which is peculiar to the New World, is not to be entirely wiped out, a desert national park or monument should be established without delay. Evidently the director has been visiting the 5 and 10c stores.

The gummy, soapy juice pressed from the leaves of *Agave americana* will lather like soap and is used by Mexican women as a detergent in washing fine fabric where alkali would be injurious to the goods being washed.

A booklet still in manuscript but ready for the press is to be published some time during 1933 by the University of Arizona. The author, J. M. Breazele, with the able assistance of his sister, Lucreta, are the same team that compiled the "Color Schemes of Cacti" published in 1931 by the University of Arizona. This work, as it was explained to me, is to fill a need that so far has been untouched; it is a comprehensive description for the novice of most of the cactus native to the southwest, giving in detail just where each species may be found, leading the student to the exact spot where it is known to occur. This will be the answer of the University of Arizona to the many questions and inquiries made of them concerning cacti in recent years.

Catalogues Received by the Librarian

Knickerbocker Nursery, 6163 Bach St., Route 1, San Diego, Calif. (free.)

Rex D. Pearce, Merchantville, New Jersey (free).

J. A. McDowell, Apartado 167, City of Mexico, Mexico (free).

R. Graessner, Perlberg, Germany (free).

Aloe and Agave Garden in California

The Aloe and Agave garden in San Diego's fine Balboa Park to be developed by the San Diego Floral Association has been progressing satisfactorily the past three months.

The idea of such a collection and the plan for the same was given by Miss K. O. Sessions a year ago—but the construction of a road on two sides of the location has caused delay.

All the Agaves and Aloes collected are now planted and during the winter the Mesembryanthemums that will be used for a ground cover among the Agaves and on the steep slopes to the new road will be planted.

Cash amounting to $115.90 has been spent for labor only. The plants were all donated by members and friends of the Association. Also the Huntington Botanic Garden, at San Marino, the nursery of E. O. Orpet at Santa Barbara and several friends in other locations of Southern California have given generously of varieties, all different from each other and different from those collected in San Diego. It is anticipated that the collection of varieties will steadily though slowly increase and the garden will be yearly of more and more interest and value.

Any one wishing to donate new varieties should communicate with Miss K. O. Sessions at Pacific Beach, Calif., and arrangements will be made for the delivery. Plants 6 to 18 inches are the best sizes.

This location in Balboa Park is without doubt the very best in the United States where such a collection of Agaves and Aloes can be maintained in the open and flourish well.

The following lists the varieties but not the quantity as there are many duplicates. The area under cultivation is about one-half acre and more adjacent area is available for the future.

MRS. MARY GREER.
Pres. of San Diego Floral Association.

AGAVES

Agave albicans
Americana and its 3 and 4 varieties
angustifolia
apotycantha
atrovirens var. sigmatophylla
attenuata
brachystachys
cantala
cerulata
chloracantha
corchoriodonta
deserti
dyckia rariflora
dyckia brevifolia
ellemeetiana
filifera
ferox
Franceschiana
Franzozini
huachensis
horrida
Kerchovei
lopantha
marmorata
negeliana
nickelsiae
Agave oblongata
polycantha
rupicala
Sartorii
Salmaniana
Serrulata
Shawii
Shawii variety
sisalana
spectabilis
tequiliana
Treleasii
univattata
Utahensis
Verschaffelti
Victoriae—reginae
Vilmoreana
yuccafolia

ALOES

Aloe africana
arborescens
arborescens pachythrysae
arborescens winterii
arborescens viridifolia
arborescens natal species
Bedinghausii
Brunnthalis
cameronii
distans
eru
eru cornuta
eru erecta
spotted eru
ferox
glauca
Greatheadii
Greenii
Heterocantha
Humulis
Humulis echinata
lineata
linearis
lateritia
latifolia
macrocarpa
macrolada
minima
mitraeformia
nobilis
plicatilis
Picta
pienaarii
pratensis
preciosa
pretorensis
rubrolutea
Salmdyckiana
Saponaria
schimperi—sp?
supraelevis
succotrina
variegata
vera
spotted vera
virens
yuncinata
Aloe-gasteria hybrids
gasteria Beguinii
Pethamensis
some few unknown varieties.

MESEMBRYANTHEMUMS

Varieties available in San Diego

Mesem. aberdennensi
alstonii
aureum
Brownii—in several shades
Bulbosum
caulescens
croceum
deltoides
echinatum
Ecklonis
edule
equilaterale
filicaule
floribundum
glaucum
integram
laeve
Lehmanii
linguaeforme
puterillii
roseum
rhomboideum
roseum hybrid—3 varieties
speciosum
tigrinium
tuberculatum
vespertinum
violaceum

Any one interested and wishing to donate varieties different from those in the lists, if they will communicate with Miss K. O. Sessions, Pacific Beach, Calif., arrangements will be made for receiving the specimens.

No large plants are desired. Plants 6 to 18 inches are the best.

NOTE: The following 8 pages are the 18th installment of the Britton and Rose reprint of Vol. I, The Cactaceae.

Notes on Britton and Rose

Edited by E. M. BAXTER

86a. Opuntia impedata Small, sp. nov.

Prostrate, ultimately copiously branched, the joints often piled several layers deep and forming viciously armed mats, elliptic or oblong, mostly 1 to 15 cm. long, rather thick, pale green; leaves

FIG. 235.—Opuntia impedata.

stout-subulate, 4 to 6 mm. long, erect or ascending, slightly curved upward, dark green; glochids brownish; spines subulate, usually numerous, solitary or 2 together, light gray, except the brown tip, salmon-colored when dry, and faintly banded when wet; flowers often several on a joint; ovary obconic, nearly terete; sepals green, outer lanceolate to ovate, 4 to 8 mm. long, acuminate, the inner much larger, with shoulders of very broad body narrowed into stoutish tip; corolla bright yellow, 4.5 to 5.5 cm. wide; petals about 12, 2.5 to 3 cm. long, broadly obovate to cuneate-obovate, broadly rounded at apex, mucronate; anthers nearly 2 mm. long; berry clavate, about 3 cm. long, narrowed at base; umbilicus rather small, somewhat concave; seeds rather few, 4 to 4.5 mm. in diameter.

Sand dunes, northeastern Florida. Type in the herbarium of the New York Botanical Garden; collected on dunes at Atlantic Beach, Florida, in April 1921, by J. K. Small.

Dr. Small notes that the stiff spines may penetrate leather shoes and that the plant is very prolific, both vegetatively and through its fruit.

Figure 235 is from a photograph taken by Dr. Small of the type plant.

CACTUS CULTURE

This is the most up-to-date, practical and comprehensive book published on the culture of Cacti. The most experienced as well as the beginner will find in this book suggestions which will prove both profitable and interesting. 186 pages 5½x8 with fabrikoid binding. Price $2.00. Cactus & Succulent Society of America, 1800 Marengo St., Los Angeles, Calif.

BOUND VOLUMES of the Cactus Journal, Vol. I, II, and III, are now on sale; these will be very valuable before many years, so take advantage of the opportunity at this time, price $6.00 per volume. CACTUS AND SUCCULENT SOCIETY, 1800 Marengo St., Los Angeles, Calif.

A List of Annotated Observations on the Remarks of Dr. K. von Poellnitz Concerning A. Berger's Classification of Succulent Euphorbiae

Part III

By LEON CROIZAT

(See illustrations in Part I, December Cactus Journal)

Oddly, Berger has described a *mammillaris* which exhibits the same tubercles: six-sided, formed on angles flattened and little prominent. This much in opposition to all the other types of *mammillaris* described by him. In the same way Brown has opposed his low-tubercles *fimbriata* to round, hemispherical-tubercled true *mammillaris*, of Linnaeus as we shall see a little later.

It is well, therefore, that we proceed to a little investigation of our own, ascertaining in what relationship Brown's *fimbriata* stands with Berger's *erosa*. For the purpose I will arrange a contrasting synopsis of the main elements of both plants, formed from elements drawn from Flora Capensis, Monatsschrift fuer Kakteenkunde and Sukkulente Euphorbien. The results are the following:

Erosa, of Berger: *10-angled (single specimen) on the main stem.*

Fimbriata, of Brown: *7-12 angled (average of many specimens).*

Erosa, of Berger: *Angles obtuse and little prominent, tubercles six-sided.*

Fimbriata, of Brown: *Tubercles broadly and obtusely subconical-six-sided.*

Erosa, of Berger: *Spines approximately 3 1/2-7 lines long*

Fimbriata, of Brown: *Spines* 3-8 *lines long.*

Erosa, of Berger: *Dioecious, male flower not seen. Female flower almost sessile at the axil of the upper tubercles, single, small with 4-5 bracts; bracts inverted-egg-shaped, ciliate, brownish. Involucre cup-shaped, about 1 1/4 lines long, interiorly villose; lobes 5, short, ciliate; glands 4 more generally 5, almost round, yellow-green, patent; ovary sessile, nude; style rather long, tips short, diverging, erect.*

Brown's fimbriata: *Plant dioecious. Flowers clustered at the apex of the branches, solitary in the axil of the tubercles. Female flower not pedunculate, sessile surrounded by the bracts (3-4), oblong, obtuse, entire; involucre 1 1/4-1 1/2 lines in diameter, cup-shaped, glabrous, green with 5 glands and 5 transversely rectangular, denticulate lobes; glands about 1/2-3/4 lines in their greater diameter, transversely oblong or with their inner margin nearly straight and the outer forming a semicircle, entirely or minutely crenulate, rugose, green; ovary sessile, subglobose, scarcely angular without a calyx at its base, glabrous; styles 1 line long, united for half their length in a stout column, with stout, spreading, deeply bifid tips, green. Fruit not seen.*

This comparison suggests very strongly that *Euphorbia erosa*, Willdenow and *Euphorbia fimbriata*, Scopoli, of Brown, are the same type and when one considers the entire set of species described by either author it is impossible to escape the conclusion that *mammillaris* with broad, obtusely subconical tubercles (distinct from true *mammillaris* of Linnæus, the tubercles of which are hemispheric) is both *Euphorbia erosa*, Willdenow, of Berger and *Euphorbia fimbriata*, Scopoli, of N. E. Brown. The characters of the two allegedly different species are the same, and whatever difference may be noted in the diagnoses is due to the choice of the words, to the number of elements described or to the difference of observing powers between the two authors. Berger, for instance, who sees the glands of *E. erosa:* yellow, in Monatsschrift fuer Kakteenkunde, estimates them to be green-yellowish in Sukkulente Euphorbien, always observing the same specimen. These considerations are so well known that I indulge in them ex abundantia.

Euphorbia fimbriata, Scopoli, of N. E. Brown, ought be called, therefore, *Euphorbia erosa*, Willdenow, because Berger gave this name the precedence in time. Berger's synonyms and assumed old names, however, can not be taken at their face value. He was a good observer, but he could not count on a large library of references and originals. It belongs to the record (cfr. Monatsschrift fuer Kakteenkunde XV, 1905) that he had to engage in correspondence to secure the original description of species *erosa*, being at last favored by friends in Berlin. This condition is very unfortunate and alone suggests caution and discrimination before taking anything for granted.

The publication of *E. erosa*, Willdenow (Suppl. En. PC., 1813, page 27) in full translation from Latin reads as follows:

Euphorbia erosa: *Euphorbia generally nine-angled, naked. Margin of the angles wavy, erose-denticulate; spines solitary. This plant is found in botanical collections under the name of Euphorbia cereiformis. It does not agree, however, with the illustration of Burmann and Plukenet and is not many-angled. Leaves extremely small, lanceolate grow at the apex of the stem. Shrub.*

I shall deal in full with the illustrations of Burmann and Plukenet in a coming study of synonyms of *E. cereiformis*. For the present I shall note that *Euphorbia erosa*, Willdenow has been, and still is controversial.

Steudel (Nom. Botanicus, ii, page 615) fur-

nishes us, however, a first class reference. He lists *Euphorbia erosa,* Willdenow, and gives *Treisia erosa,* Haworth as its synonym. Haworth himself has this much to say on the subject. (Suppl. Plt. Succ. 1819, page 66—translated from Latin in full):

Treisia erosa: *Generally nine-angled, naked; margin of the angles wavy, erose denticulate, spines solitary (Euphorbia erosa, Willdenow, Enumeratio Plantarum, page 27). Habitat unknown. Mr. W. Anderson (of the Chelsea Gardens, L. C.) has received in 1818 a small, nearly dead specimen of E. erosa, Willd., from Herr Otto of the Royal Botanical Garden of Berlin.*

Observation: The spines of this species are florriferous, located at the apex of the stem between the leaves, which are small, lanceolate, hairy. Flowers not seen. The plant from Herr Otto is almost the same type which I have published under the name Euphorbia polygona; it differs from it on account of possessing larger, somewhat hairy leaves.

I believe these data are sufficient to prove that *Euphorbia erosa,* Willd. was never meant to serve as the specific head of any *mammillaris,* and that Berger has no justification for using it in connection with the type he describes.

The names *E. fimbriata,* Scopoli and *E. erosa,* Willd. having been disposed of, the mammillaris with flattened angles and broad six-sided tubercles must be named ex novo. I propose to publish it under the name: *Euphorbia latimammillaris* (to-wit: Euphorbia with broad tubercles). The key description is the following:

Euphorbia latimammillaris, species nova-succulent shrub, 1/3 feet tall, naked, spiny, dioecious, richly branching. Angles 7/12, flattened, sometimes irregularly ascending, divided by transversal lines into broad, obtusely subconical tubercles, six-sided. Spines (modified peduncles) stout, succulent, becoming with age red and finally whitish-grey. Leaf small, soon deciduous. Male flowers short-pedunculate, female sessile, at the apex of the branches. Syn. (in part only) *E. Erosa,* Willdenow, of Berger —Sukk. Euph., page 90, and Monatsschrift fuer Kakteenkunde, XV (1905) page 29; Euphorbia fimbriata, Scopoli, of N. E. Brown *(Flora Capensis, V ii, page 347) and Von* Poellnitz (Zeitschrift fuer Sukkulentenkunde (1927) page 177—*E. mammillaris,* hort., not Linnaeus.

Details of the flower are given by Brown under *E. fimbriata* (Flora Capensis 1 cl). Berger mentions as a specific character the upturning of the spines, but this is not a certain element, other *mammillaris* presenting, although rarely, the same character.

It is now time to consider *Euphorbia mammillaris* Linnaeus, the mother species, which has been listed both by Berger and by N. E. Brown. Disregarding precedence in year, let us begin with Brown's description.

N. E. Brown writes of *Euphorbia mammillaris,* Linnaeus (Sp. Plt. i, page 415 and Amoe. Ac., iii, page 108) in Flora Capensis, V ii, page 346, listing No. 142. The description he gives of it is very detailed, most minute, and cannot be reported in full because of lack of space. The observation following the description proper, however, is possibly more illuminating of the whole subject than the description itself as such. Suffice it to say, so far as the description goes, that the species described is a *mammillaris,* with prominent and hemispherical tubercles. The observation reads in part as follows:

This species seems to have been founded by Linnaeus entirely upon the figure in Commelin's Praeludia Botanica. No specimen of it exists in his herbarium and probably he never saw the plant.

It is quite clear that Commelin's figure represents the Uitenhage and Port Elizabeth plant and not that figured by Berger (Sukkulente Euphorbien, page 91) as E. mammillaris, which is a native of a more Westerly part of Cape Colony and is commonly cultivated under that name. But the true mammillaris is a stouter and softer plant, with more prominent and more hemispherical tubercles.

It would be idle to discuss the point whether *Linnaeus ever saw the plant. It is true that he* does not mention it as existing either in the Garden of Clifford or in that of Uppsala, but the plant was well known in Holland even before the days when Linnaeus was connected with the Garden of George Clifford in Hartecamp, Netherlands (about 1737). What seems to be incontrovertible, however, is that if ever Linnaeus saw the plant, he had under the eye the type of Commelin, for the very same round-tubercled type was illustrated after Commelin by J. W. Weinman in 1736 (Bloemdragende Gewassen, table 498, Amsterdam) under the name: Euphorbium ceri (sic) effigie spinis validioribus armatum. I am glad to contribute a tracing of the table of Commelin's Praeludia (Fig. 7). The engraver, surmounting considerable difficulties of technical nature, has done a very good piece of work, fully catching the impression made on the onlooker by the round and hemispherical tubercles and the stout and succulent build of the species.

N. E. Brown rightly claims that this soft, round-tubercled *mammillaris,* which lives in the Uitenhage District of the Cape Colony, is the only true *mammillaris,* of Linnaeus. It is all the more remarkable, then, that he does not seem to give attention to the second type of

FIG. 7

mammillaris of which he speaks in the observation following the description of *E. mammillaris* of Linnaeus. This type in Brown's own words is distinct from true *mammillaris,* of Linnaeus, by the following very important characters:

a. Habitat—Western Cape Colony instead of Eastern Cape Colony (Uitenhage district and Port Elizabeth).

b. Habit—More slender and less soft than true *mammillaris.*

c. Aspect—Tubercles distinct in shape from true *mammillaris:* to-wit, not so round and hemispherical.

d. Attribution—This type is so much distinct from true *mammillaris,* L., that Berger has erred—Brown clearly implies this much—in listing it as *Euphorbia mammillaris,* L.

This data are furnished by N. E. Brown himself and would tend to justify alone the doubt that this second, Western type of *mammillaris* is a separate species. I can add on good grounds some other considerations:

1. The Western type of *mammillaris,* described by Brown and erroneously published by Berger under the name *E. mammillaris,* L., is possibly more distinct morphologically from true *mammillaris* than so-called *E. fimbriata* of

Brown is from it. Setting specimens side by side does not permit of doubt on the scores: even an untrained observer will immediately recognize the plants as different.

2. Dealers *in loco* of habitat (Cape Colony) undiscriminate in their choice of names as a rule, sell seeds of *true mammillaris* and *Western mammillaris,* making mention of "two different" kinds of plant.

Seedlings obtained from these seeds reveal after the very first days of life characters which sharply differentiate them: *Western mammillaris,* true to its adult pattern, exhibits tubercles not very prominent, which almost immediately tend to congregate into a tessellate whole. *True mammillaris,* on the contrary, shows tubercles which are very distinct, almost isolate, conical. This data is so apparent that there is no chance or possibility to confuse seedlings of one type with those of another.

3. Berger, who at all event was a very keen observer and had had a lifelong association with plants of all types, assigned the two kinds to distinct heads, at least subspecifically: he called *true mammillaris* Euphorbia *mammillaris, varietas spinosior* (cfr. description in Sukk. Euphobien, page 90), distinguishing it from the Western Cape Colony *mammillaris,* which he named, although admittedly incorrectly: *E. mammillaris,* L.

On the face of all these characters and considerations, in the very weightiest of which N. E. Brown himself concurs, it seems necessary to list the Western Cape Colony under a separate specific head. No name being available, I propose to publish it as: *Euphorbia platymammillaris* (to-wit: Euphorbia with flattened tubercles). This is an abridged description of the new species:

Euphorbia platymammillaris, species nova—shrub, 1/3 foot tall, branching, spiny. Stems and branches round, slenderer and more elongated than those of *E. mammillaris,* L. Angles 7/12, often spirally ascending, divided by transverse impressed lines into almost flat tubercles, generally six-sided. Leaves lanceolar, about twice as long as those of *E. mammillaris* L., soon deciduous, leaving a scar prominent. Spines (modified peduncles) numerous, slender, long, bracteate, becoming red and whitish with age. Syn. (in part) *E. mammillaris,* L., of Berger (Suk. Euph. 90, and Monatsschrift fuer Kakteenkunde, XII, 1902), *E. enneagona,* hort. of Pasadena, Cal.

Euphorbia submammillaris, Berger, is uncontroversial, all botanists agreeing on its specific entity and characters. Good identification elements of *Euphorbia submammillaris,* Berger, are: tubercles round, almost wholly breast-shaped; grooves between the angles deep with transversal lines cutting across the angles, although seldom reaching all the way down to the very bottom of the groove. Younger leaves and spines prettily lined with distinct violet-purple color (not red).

The consideration that it may seem rash and unjustified to increase the burden of specific names when it is generally well understood that error and confusion are due to the abundance of specific denominations, not in every case well established, prompts me to remark, in conclusion, that every single one of the species I have listed, old and new alike, have been known and described at one time or the other as different entities, either by Berger and Brown or by both of them. All the species in question are familiar to the collector and to the student, and can easily be told apart, particularly on investigation of the characters of one year old growth. As a matter of record and fact the following types are recognized:

1. Type stout, succulent, spiny, with hemispheric, prominent, round tubercles. Original habitat: District of Uitenhage, Eastern Cape Colony, fide N. E. Brown. Illustrated and described by Commelin, Weinman, Linnaeus. known as:

Euphorbia mammillaris, Linnaeus (Sp. Plt., i, 415, and Am. Ac., iii, 108).

2. Type slender, elongated, with flat tubercles. Original habitat: Western Cape Colony, fide N. E. Brown. Illustrated and described by Berger (Monatsschrift fuer *Kakteenkunde* and Sukkulente Euphorbien, 1. c.) under the incorrect name: *Euphorbia mammillaris,* L. To be known as:

Euphorbia platymammillaris, species nova.

3. Type distinct by broad and subconical tubercles, angles flattened. Original habitat not listed. Illustrated and described by Berger (Monatsschrift fuer Kakteenkunde and Sukkulente Euphorbien, 1. c.) under the incorrect name *Euphorbia erosa,* Willd.—described by N. E. Brown (Flora Capensis, 1. c.) under the incorrect name: *Euphorbia fimbriata,* Scopoli. To be known as:

Euphorbia latimammillaris, species nova.

4. Type with breast-like tubercles, prominent angles, transverse lines generally not reaching all the way to the bottom of the grooves between the angles. Illustrated and described by

Berger (Monatsschrift fuer Kakteenkunde and Sukkulente Euphorbien, 1. c.)—described by N. E. Brown (Flora Capensis, 1. c.) under the uncontroversial name:

Euphorbia submammillaris, Berger.

The existence of hybrids may not be excluded. Local conditions of climate and soil affect somewhat size and branching, conditions of humidity causing elongation of growth.

I am glad to acknowledge a debt of gratitude to Mrs. John Wright of Santa Barbara, California, to Prof. van den Houten of Rotterdam, Holland, and to Mr. Eugene Ziegler of Spencerport, N. Y., who have kindly furnished me cuttings and seedlings with the indication of trade and local horticultural names.

The final criterium of the value of specific listings in systematic resides in adherence to formal truth (assumption of correct elements of differentiation between similar types); respect of formerly established names and classifications as far as compatible with formal truth; practical usefulness in everyday dealings confronting types of vegetation. I shall be glad if whatever I may happen to submit to the reader shall be judged according to the principles I have taken the liberty to record.

What Grows Where

Cacti Listed in Accordance With Their Geographical Origin

Compiled and Copyrighted for Mrs. John D. Wright, Santa Barbara, Calif., 1933

By ANNE SMITH

ALABAMA

OPUNTIEAE

SUBGENUS 3. PLATYOPUNTIA

Tortispinae

O. pollardii

TYPE LOCALITY: Biloxi, Harrison County, Mississippi.

DISTRIBUTION: Coastal plain, Church Island, North Carolina, to northern Florida, Alabama, and Mississippi.

O. opuntia

TYPE LOCALITY: In Virginia.

DISTRIBUTION: Sandy and rocky places from Massachusetts to Virginia, the mountains of Georgia and central Alabama extending north into southern Ontario, Canada (Point Pelee) west in isolated colonies to northern Illinois, eastern Missouri and Tennessee, and long established in the mountains of northern Italy and Switzerland.

ARIZONA

OPUNTIEAE

SUBGENUS 1. CYLINDROPUNTIA

Ramosissimae

O. ramosissima

TYPE LOCALITY: In California, near the Colorado River.

DISTRIBUTION: Southern Nevada, western Arizona, southeastern California, northwestern Sonora and probably northeastern Lower California.

Leptocaules

O. arbuscula

TYPE LOCALITY: On the lower Gila near Maricopa village.

DISTRIBUTION: Arizona and Sonora.

O. congesta (Griffiths—Ill. Stud. in the Genus Opuntia II. Rep. Missouri Bot. Garden, 20, p. 88, 1916).

TYPE LOCALITY: Near Hillside, Arizona.

DISTRIBUTION: Not cited.

ARIZONA (Continued)

Leptocaules (Continued)

O. neoarbuscula (Griffiths—Ill. Stud. of the Genus Op. 1. Missouri Bot. Garden, p. 260).

TYPE LOCALITY: In the foothills of Santa Rita Mountains, Arizona.
DISTRIBUTION: Not cited.

Thurberianae

O. vivipara

TYPE LOCALITY: Near Tucson, Arizona.
DISTRIBUTION: Known only from type locality.

O. tetracantha

TYPE LOCALITY: Five miles east of Tucson, Arizona.
DISTRIBUTION: Known only from the region about Tucson, Arizona.

O whipplei

TYPE LOCALITY: About Zuni, New Mexico.
DISTRIBUTION: Northern New Mexico and Arizona to southwestern Colorado and probably southern Utah. Also reported by Coulter in southern California, Lower California, and Sonora, but not to be expected there.

Echinocarpae

O. acanthocarpa

TYPE LOCALITY: On the mountains of Cactus Pass, Arizona, about 500 miles west of Santa Fe, New Mexico.
DISTRIBUTION: Arizona and California; reported also from Utah, Nevada, and Sonora.

O. echinocarpa

TYPE LOCALITY: In the Colorado Valley near the mouth of Bill Williams River.
DISTRIBUTION: Nevada, Utah, Arizona, California, and Lower California.

Bigelovianae

O. bigelovii

TYPE LOCALITY: Bill Williams River, Arizona.
DISTRIBUTION: Southern Nevada, Arizona, California, northern Sonora, and northern Lower California.

Imbricatae

See next page.

OPUNTIEAE

SUBGENUS 1. CYLINDROPUNTIA

Fulgidae

O. fulgida

TYPE LOCALITY: Mountains of western Sonora, Mexico.
DISTRIBUTION: Gravelly and sandy situations, southern Arizona, Sonora, and Sinalao.

O. spinosior

TYPE LOCALITY: South of the Gila River.
DISTRIBUTION: Arizona, western New Mexico, and northern Mexico.

Clavatae

O. stanlyi

TYPE LOCALITY: On the del Norte and Gila, New Mexico.
DISTRIBUTION: Southwestern New Mexico to eastern Arizona and adjacent Mexico.

O. pulchella

TYPE LOCALITY: Sandy deserts on Walker River, Nevada.
DISTRIBUTION:

(To be continued)

We feel that a suggestion by Margaret Samuels in the January issue of the Sunset Magazine is worthy repeating here. "In freezing weather tie pieces of suet to a tree branch to feed the birds which have been keeping your succulents free from many pests."

The German Cactus Magazine "Kakteen" has changed its title to Kakteenkunde on Jan. 1, 1933, and will be published and controlled in the future by the firm of J. Neumann Neudamm. The magazine contains less scientific material.

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